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Review of the Air Quality Criteria for Ozone and Other Photochemical Oxidants

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This report documents the Committee's findings relative to its review of the Air Quality Criteria for Ozone and Other Photochemical Oxidants prepared by the Agency's Environmental Criteria and Assessment Office. CASAC unanimously concluded that this document represents a scientifically balanced and defensible presentation and interpretation of the scientific literature.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D C. 20460

October 22, 1986

The Honorable Lee Thomas
Administrator
U.S. Environmental Protection
Agency
Washington, DC 20460

OFFICE OF
THE ADMINISTRATOR

Dear Mr. Thomas:

The Clean Air Scientific Advisory Committee (CASAC) has completed its review of the Air Quality Criteria for Ozone and Other Photochemical Oxidants prepared by the Agency's Environmental Criteria and Assessment Office (ECAO). The Committee unanimously concluded that this document represents a scientifically balanced and defensible summary of the extensive scientific literature on these pollutants.

The CASAC's current review cycle for ozone and other photochemical oxidants has included public meetings on March 4-6, 1985, and April 21-22, 1986. The Committee was impressed with the efforts of the staff of ECAO in preparing a well written, integrated and thorough review of recent relevant scientific studies.

It is evident that the Agency responded to CASAC's request to ECAO that criteria documents contain health summary chapters that integrate data from toxicological, epidemiological, and clinical studies. The summary health chapter of this document appropriately emphasizes the singularly important role of exercise as a factor in determining response to ozone. Although somewhat understated in the criteria document, exercise is clearly the dominant factor affecting the response to a specific ambient concentration of ozone in acute exposures. Despite speculation regarding variables, such as age, sex, smoking status, pre-existing lung disease, nutritional status, and red blood cell enzyme deficiencies, little conclusive evidence is available to link these factors to ozone responsiveness.

As a corollary, although the identification of populations potentially at risk from ozone exposure is of obvious importance, it is apparent that at risk groups are not as well defined for ozone as they are for other criteria pollutants. Wide variability of response from subject to subject exists, while intrasubject variability is not as great. At the April 1986 review meeting, the Committee recommended that the document further emphasize reproducibility of response in given individuals and the fact that we cannot at this time define the parameters that lead to such a response. Research should be undertaken to identify those factors and mechanisms that can make a given individual susceptible to ozone.

One of the more controversial issues in the Criteria Document is how to classify so-called "responders". This represents a key issue in the evaluation of public health risks from ozone. This group is characterized at present only by its response to ozone and possesses no other known distinguishing characteristics. There is no consensus as to whether "responders" constitute a specific population subgroup or simply represent the upper 5-20% of the ozone response distribution in the general population.

Several carefully executed investigations on animals provide cause for concern over long term exposures to ambient ozone levels. While it is not possible at the present time to conclusively extrapolate the quantitative results from animal studies to humans, the Committee recommended at its review meeting that the Agency integrate the information derived from animal studies into the health summary chapter, insofar as possible. In addition, CASAC believes such toxicological information should be an important basis for decisions on directions for future research.

The discussion of the effects of ozone and other photochemical oxidants on vegetation provides a reasonably complete update and analysis of the literature. The Committee acknowledges that the document accurately describes the National Crop Loss Assessment Network (NCLAN) studies and that NCLAN data constitute the bulk of the agricultural crop data. The results of NCLAN indicate that regionally elevated levels of ozone influence the yield of several sensitive agricultural species. However, NCLAN focuses on agricultural crops of significant commercial value but does not evaluate potential damage to forest systems or ornamentals. Consequentially, one member of the Committee expressed major reservations regarding the regulatory use of NCLAN data.

With respect to the influence of ozone on natural ecosystems, the document accurately characterizes the potential for ozone to alter ecosystem structure and function using the well documented studies in the San Bernardino National Forest of California. The hypothesis that ozone is a contributory factor underlying the reported declines in forest productivity elsewhere in the United States has not been definitively evaluated and warrants further investigation.

There is growing evidence that ozone is only one of several important constituents in the complex and often non-linear chemical behavior of regional, as well as local air pollution. The Agency needs to pay careful attention to understanding the nature and implications of these interactions in both its future research and regulatory activities.

A separate report will be prepared reflecting the Committee's final conclusions and recommendations on the National Ambient Air Quality Standards (NAAQS) for Ozone when the Agency's Office of Air Quality Planning and Standards completes the companion document, the Staff Paper for Ozone (Review of the NAAQS for Ozone: Assessment of Scientific and Technical Information).

Thank you for the opportunity to present the Committee's views on these important public health and welfare issues.

Sincerely,

Morton Lippmann

Morton Lippmann, Ph.D.
Chairman
Clean Air Scientific Advisory
Committee

cc: Mr. A. James Barnes
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Mr. Craig Potter
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